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Atlantic Richfield Company 711 West Eighth Avenue Post Office Box 360 Anchorage, Alaska 99510

Attention: W. P. Metz

Gentlemen:

As presented in your and Sohio's PSD permit application for Prudhoe Bay, the results of detailed dispersion modeling analysis revealed that the major contributors to the highest pollutant concentrations in the Prudhoe Bay Unit were those of nongas-fired emitters. Table 8.0-2 of the PSD permit application summarized the highest impacts on air quality due to both the existing and the proposed emission sources in the Prudhoe Bay Unit, as well as identified the major contributors and the percent of contribution from each. In all cases, the major contributors with a total of 95 percent or more of the highest concentration were either diesel generators, incinerators, production/space heaters, or any combination of these three; except that the gas turbine generator located at the A.R.Co. Operation Center contributed 46.1 percent of the highest 3-hourly hydrocarbons (HC) concentration of  $42\mu g/m^3$ . Detailed supportive data for these conclusions were presented in Tables 9.2-1 through 9.2-4 and in Appendix C, Parts 1 through 21 of the PSD permit application.

The reason for having the nongas-fired emitters as major contributors to highest pollutant concentration was due to their relatively short stacks. Gas-fired turbines emitted many more nitrogen oxides (NO<sub>v</sub>) than nongas-fired emitters but their effective stack heights were also much higher. The net effect of combining the gas-fired and nongasfired emitters in the Prudhoe Bay Unit was that the highest pollutant concentrations were primarily determined by nongas-fired emitters.

During a visit to the Prudhoe Bay unit in early September, Rob Wilson, EPA Region X and Pat Metz, A.R.Co., noted that the flow station production/space heaters' stack heights were approximately twice what



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had been used (7.6 meters or 25 feet) in our original dispersion modeling analysis. According to A.R.Co., the stack heights for these facilities are approximately 70 feet (21.3 meters). The effect on the modeling results of using the correct stack heights can be qualitatively assessed by analyzing the modeling results of using stacks of 13.2 meters or 50 feet. Table 1 shows the results, for annual NO, concentrations, when stack heights of 7.6 meters were used (Flow Station 2 is at 449.5, 7195.5). A culpability analysis revealed that 93 percent of the highest concentration ( $82\mu g/m^3$  at 449.3, 7795.5) was contributed by the production/space heaters. Thus, 7 percent or  $6\mu g/m^3$  was contributed by other facilities. Table 2 shows the results when stack heights of 13.2 meters were used. The concentration at receptor 449.3, 7795.5 was 21µq/m<sup>3</sup>. The contribution from the production/space heaters was therefore  $15\mu g/m^3$ , a reduction of 80 percent. An analysis was made of the reduction at other receptors with relatively high concentration in the original dispersion modeling and a consistent pattern was found. In all cases, the reduction was 80 percent. The situation in the vicinity of the other flow station was identical, namely a reduction of 80 percent occurred.

The employment of Briggs' plume rise formula to gas-fired turbines either at a 100 percent level or at a 70 percent level would also not change the results of dispersion modeling analysis to any significant degree. In order to substantiate the above statement, additional dispersion modeling calculations were made for several selected cases which had previously been identified as causing high pollutant concentrations. The modeling approach and input data were identical to the previous ones, except that only 70 percent of Briggs' plume rise values were allowed for all gas-fired turbines. These selected cases include the worst annual and 24-hour total suspended particulates (TSP), the worst 3-hour HC, and the worst 1-hour carbon monoxide (CO). Because gas-fired turbines primarily emit  $NO_x$ , the entire modeling analysis for annual average NO<sub>2</sub> concentrations was repeated. Results of the remodeling analysis are presented in the attached computer tabulated forms which have the same table number or appendix part number as their corresponding cases presented in the PSD permit application, except that the number is followed by a letter "a" in parentheses for the purpose of easy identification.

By comparing the two sets of modeling results, it is noted that the reduction of Briggs' plume rise to 70 percent of its full value on gasfired turbine has practically no effect in the cases of highest concentrations of TSP, HC, and CO. The effect on  $NO_2$  concentrations is more noticeable; however, the highest annual average  $NO_2$  concentration

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